Effectiveness of Simultaneous Blending of User Experience and System Development Lifecycle Models in Application Developments

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Abstract

In this paper, we attempt to simultaneously mix the user experience with the system development lifecycle to show the effectiveness of the application from usability perspectives and user experience, we build an application using three different development environments, namely, IBM DB2, Visual Basic, and MS Excel. The study reveals that spontaneous mixture of user experience and system development life cycle models could significantly provide high acceptance of products from different users. Despite the fancy user interface, the analysis indicates that the mixture should be a norm for developing applications. Study also demonstrates the effectiveness of the mixture by ensuring good quality outcomes. In addition, we evaluate the interface and functionalities of the application from the usability standpoint and user’s perspectives.

Keywords: IBM DB2, Visual Basic Forms, Usability, User experience, Design, Interface

1. Introduction

The massive proliferation of various applications has been ongoing development metaphor in many companies and startups. In the recent time, there are tones of developmental environments in which enable developers to build applications easily using the built-in features and tools such as Visual Studio, Goomla Framework, etc. The underlying reasons for the huge proliferation of these applications are the current available tools and the need of people for these applications as well as the trend of people toward computerized. Despite the immersive applications widespread across different platforms and sectors, there is still a need to devote attention to the ease of use of these applications from developers. Providing effective accessibility and navigation is basically what make application distinguishable from other competent and make it holds for quite long period.

Usability of applications has been the eye grabber for decades. It is basically concerned about applications how can be learnable and comprehensible easily to users [1]. More specifically, usability has been defined as the effectiveness, efficiency, and satisfaction of users while attempting to accomplish some specific goals in particular environments (ISO 9241). Radically, with the aid of the advancement of technology that provides insights on how to develop complex application in a way that is more effective and easy to use; applications can be more usable using the flow of information that appears to be dramatically increased on internet every day. However, in other terms, technology is advanced and that leads to advancement of human being on perceiving and manipulating things in a way that is

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basically different from the one we have already known. Expansion of users’ response and satisfaction is growing on the same curve as the technology progresses [2, 3].

General usability does not only concern about the fancy user interface but it is also concerned about the structures and architectures of the application in which allow transformability of the applications to fit different platforms and different cultures (e.g. Language) if necessary and that is called “Localization of Application” [4].

In this paper, we attempt to associate the relationship between the adoption of usability parameters and heuristics and how these parameters contribute to the success of the design and development of the applications. The motive notion is “Can we develop applications that are localized and usable to various users despite their abilities?” We try to satisfy this question by developing an application using IBM DB2 and Visual Basic 6 by adopting usability guidelines and testifying the effectiveness of these guidelines to determine if the application is being localized and usable. The remaining of this paper is organized as section 2 describes related work, section 3 articulates the application and its developments, section 4 focuses on the result and its implications, and section, section 5 investigates the memory allocation requirements, and section 6 concludes the research of this paper.

2. Background

2.1. Usability of Computer Applications Interface

Usability and user-experience have been recently the center of design of any applications or systems. They are basically interchangeable terminology. This indicates success of an application is radically dependent on two components “Usability” and “User-experience”. Usability is the main pole of any application success. Limitlessly, this includes the backend, front-end, structures, architecture, and accessibility of the applications. Usability of the backend is become an emergence phenomena in the recent years due to the fast transformations of operating system platforms, browsers, etc. This phenomenon enables developers to reuse the workable code to maintain the applications and keep abreast with the evolved technology. More importantly, the workable code should own crystal clear readability in which allows other authorized personnel to perform some significant needed changes at the backend of the application. Backend of the application is more likely concerned about the maintainability and transformability of the application to meet certain evolved developmental criteria. On the other hands, the effectiveness and attractiveness of the interface is relatively upright on the architectural and narrative of the backend functional development and design [5]. From usability standpoints, interface should be visible, consistent, user-autonomy, etc as in [6]. Interface is the center channel that works as a communication panel between the applications and its users. Usability factors should be taken into considerations during the development process to ensure the effectiveness and efficiency of the user interface [7].

2.2. User Experience in Computer Application Interaction

Bearing in mind, users are expecting something exceptional than developers and designers predict. Users mostly have the tendency toward an application that substantially provides values, pleasure, ease of use, and emotional satisfactions. And this can’t be achieved by migrating past user experience and incorporating it to the current development strategy or putting developers themselves as users of the application. This definitely will result in less successful usable applications. Thus, this implies that user experience is dynamic and needs to be studied more often. As mentioned previously, users’ response and satisfaction are
enlarged along with the growth of the technology as it progresses. There has been many studies conducted on the user experience and how to design that pleasantly meet user expectation and diversity [8] [9] [10]. User experience is a person’s perceptions and responses that result from the use or anticipated use of a product, system or service (ISO 9241-210). In fact, users experience should be merged into the system development lifecycle (SDLC) to produce an effective, efficient, and ultimately satisfying. Concentrating on the quality is worthwhile of investing time in which would result in desirable and usable application.

3. Architectural Design of the Application

Herein, we collect all the required information before undertaken the actual development of the application. Application requirements are gathered from expert applications users in which they have some familiarities in using such applications particularly in term of functionalities and features that should be presented. We adopt the entire process of the methodology presented in [11]. This systematic development process empowers us to overly comprehend and understand the needs of users from usability stand points and user experience. Firstly, we concretely develop a star schema of the application in order to scheme the entire relationship among the entities and to simply facilitate the understanding of the application to various developers and obtain insights on how the association between entities is drawn. Figure 1 articulates the star schema we develop that represents the system as part of the development procedures.

![Star Schema of the Entire Application Entities](image)

Figure 1. Star Schema of the Entire Application Entities

We cluster the application into seven tables, namely, customer, agent, time, promotion, food, location, and sales as proposed by the users who would be involved in the development lifecycle to testify user experience factors. Each of the table contains several attributes or properties. These properties are refined by the users. The properties refinement is performed iteratively until final consensus reached. These tables can be described as following:

**Customer:** It contains customer relevant information and each customer is distinguished by unique identification numbers. We provide restrictions and exceptions upon identification numbers duplications.

**Time:** This table focuses on the time of each transaction made by customers, agent, and sales. Location: It stores all the information of the food distributed centers across different geographical areas.

**Agent:** It preserves information of the agents including ID, Name, and Phone Number.

**Promotion:** It represents the type of the promotion and value of the promotion that is given to certain loyal customers.

**Food:** This table contains all the food information including status, quantity, price, and food type (name).
Sales: It stores all the necessary information about the sales and it is considered to be the fact table.

As the main focus of the paper is the migration of user experience to the system development lifecycle, we attempt to develop an application to meet user expectations and have simplicity of use. The development of the application is undertaken by building the database and prototyping the user interface of the applications. Review of the prototype is done by the users to solely design according to users’ preferences and desires. As for the usability, we investigate three main parameters content, navigation, and interactivity as proposed in [12]. In addition, we incorporate some of the usability principles proposed by Nielsen and Molich in [13]. By developing an application with usability principles and user experience in mind and practically applied, the chances of the application acceptance are high. Furthermore, in the database, we name the sale table as the fact table in which mostly considers the hub of the other tables. As for the data entry, we key-in 30 records in each table to testify the workable functionalities and features of the application after it is being integrated with Visual Basic 6. The test results in a successful integration in which no errors are countered. Note that the pivot table is connected via Visual Basic and Microsoft Excel to display the entire sales for specific period of time as it is requested by the users.

![Figure 2. Front-end of food applications containing nine workable functionalities and features](image1)

![Figure 3. Pivot form design (Clicking on one button will automatically generate the table in MS Excel)](image2)

In the backend of the application, we develop a trigger that allows changes and updates in the sale table automatically upon the entrance of new data through the interface. The trigger works by subtracting the promotion discounted amount from the order price and multiply by the number of quantity ordered. In addition, the result will be shown as the sale price.

```
CREATE TRIGGER sales_price
AFTER INSERT ON sales
REFERENCING NEW AS
FOR EACH ROW MODE DB2SQL
UPDATE sales SET sales_price = (SELECT (Food.Order_price - Food.Order_price*Promotion.Pro_value)*Food.Order_quantity FROM food, Promotion WHERE order_id = N.order_id AND Pro_Id = N.Pro_Id) WHERE Order_id = N.Order_id AND Pro_Id = N.Pro_Id
```

From usability standpoints, clarity of the coding is demonstrated by simply looking at the trigger we develop. Thus, the evaluation of the entire workable coding is analyzed and
examined by three database and visual basic experts. They testify the coding of the application from numerous aspects as in (Table 1).

### Table 1. Evaluation of the Application Coding

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<th>Tester I</th>
<th>Tester II</th>
<th>Tester III</th>
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<td>Maintainability</td>
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<td>Transformability</td>
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Collectively, the three testers have reached a consensus that the coding that lies beneath the user interface is fully readable to other developers, simply maintainable, and perfectly can fit different developing environments such as MySQL. On the contrary, testers have slight disagreement upon the organization or narration of the code. Two testers testify the coding as it lacks to proper organizations. In addition, it is worthwhile mentioning that the evaluation is structured table that enables the testers to check (✓) as good and (✗) as bad. Note that only two criteria are presented in the evaluation forms. Moreover, we only investigate transformability in terms of the coding compatibility that could fit different development environments. Apart from blending users experience in the development process, the coding is independently developed without the intervention of the users. The fact is the users simply don’t possess any knowledge about the flow of the coding or the coding that works behind the interface. As mentioned previously the coding development is examined by three testers in which they have practically involved in implementation process of some projects that demand massive programming skills.

### 4. Conclusion

Apparently, we utilize the spontaneous blending of user experiences with system development lifecycle to develop a hybrid application food distribution to study the user interface and build interactive application [14] [15] [16]. The study articulates that incorporating the users’ experiences is highly recommended in satisfying users from many aspects. We also find that beneath any nice looking user interface is good quality coding that runs every function properly. Steadily, quality of the coding development is determined by the ease of maintainability and readability in which enables authorized developers to perform necessary modifications or amendments. The result suggests that mixture of user experiences and system development lifecycle is highly significant to produce products that either serve users’ satisfactions and desires in terms of functionalities or interface design. Based on the evaluation, users agree the developed application provides clear contents, simplicity of navigations. Furthermore, the applications rigorously present visibility of the contents and error-preventions.

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References


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